plate, and rub it well with a lump of beeswax. Used to form extemporaneous steam or gas pipes, to cover the joints of vessels, and to tie over pots, etc.

II.—For the production of waxed or ceresine paper, saturate ordinary paper with equal parts of stearine and tallow or ceresine. If it is desired to apply a business stamp on the paper before saturation and after stamping, it should be dried well for 24 hours, so as to prevent the aniline color from spreading.

Wrapping Paper for Silverware.—Make a solution of 6 parts of sodium hydrate in sufficient water to make it show about 20° B. (specific gravity, 1.60). To it add 4 parts zinc oxide, and boil together until the latter is dissolved. Now add sufficient water to reduce the specific gravity of the solution to 1.075 (10° B.). The bath is now ready for use. Dip each sheet separately, and hang on threads stretched across the room, to dry. Be on your guard against dust, as particles of sand adhering to the paper will scratch the ware wrapped in it. Ware, either plated or silver, wrapped in this paper, will not blacken.

Varnished Paper.—Before proceeding to varnish paper, card-work, pasteboard, etc., it is necessary to give it 2 or 3 coats of size, to prevent the absorption of the varnish, and any injury to the color or design. The size may be made by dissolving a little isinglass in boiling water, or by boiling some clean parchment cuttings until they form a clear solution. This, after being strained through a piece of clean muslin, or, for very nice purposes, clarified with a little white of egg, is applied by means of a small clean brush called by painters a sash tool. A light, delicate touch must be adopted, especially for the first coat, lest the ink or colors be started or smothered. When the prepared surface is quite dry it may be varnished.

Impregnation of Papers with Zapon Varnish.—For the protection of important papers against the destructive influences of the atmosphere, of water fungi, and light, but especially against the consequences of the process of molding, a process has been introduced under the name of zapon impregnation.

The zaponizing may be carried out by dipping the papers in zapon or by coating them with it by means of a brush or pencil. Sometimes the purpose may also be reached by dripping or sprinkling it on, but in the majority of cases a painting of the sheets will be the simplest method.

Zapon in a liquid state is highly inflammable, for which reason during the application until the evaporation of the solvent, open flames and fires should be kept away from the vicinity. When the drying is finished, which usually takes a few hours where both sides are coated, the zaponized paper does not so easily ignite at an open flame any more or at least not more readily than non-impregnated paper. For coating with and especially for dipping in zapon, a contrivance which effects a convenient suspension and dripping off with collection of the excess is of advantage.

The zapon should be thinned according to the material to be treated. Feebly sized papers are coated with ordinary, i. e., undiluted zapon. For dipping purposes, the zapon should be mixed with a diluent, if the paper is hard and well sized. The weaker the sizing, the more careful should be the selection of the zapon.

Zapon to be used for coating purposes should be particularly thick, so that it can be thinned as desired. Unsized papers require an undiluted coating.

The thick variety also furnishes an excellent adhesive agent as cement for wood, glass, porcelain, and metals which is insoluble in cold and hot water, and binds very firmly. Metallic surfaces coated with zapon do not oxidize or alter their appearance, since the coating is like glass and only forms a very thin but firmly adhering film, which, if applied on pliable sheet metal, does not crack on bending.

For the preparation of zapon the following directions are given: Pour 20 parts of acetone over 2 parts of colorless celluloid waste—obtainable at the celluloid factories—and let stand several days in a closed vessel, shaking frequently, until the whole has dissolved into a clear, thick mass. Next admix 78 parts of amyl acetate and completely clarify the zapon varnish by allowing to settle forweeks.

Slate Parchment.—Soak good paper with linseed-oil varnish (boiled oil) and apply the following mass, mentioned below, several times in succession: Copal varnish, 1 part, by weight; turpentine oil, 2 parts; finest sprinkling sand, 1 part; powdered glass, 1 part; ground slate as used for slates, 2 parts; and lampblack, 1 part, intimately mixed together, and repeatedly ground very fine. After drying and hardening, the plates can be written upon with lead or slate pencils.

Paper Floor Covering.—The floor is carefully cleaned, and all holes and

cracks are filled up with a mass which is prepared by saturating newspapers with a paste that is made by mixing thoroughly 17⅝ ounces wheat flour, 3.17 quarts water, and 1 spoonful of pulverized alum. The floor is coated with this paste throughout, and covered with a layer of manilla paper, or other strong hemp paper. If something very durable is desired, paint the paper layer with the same paste and put on another layer of paper, leaving it to dry thoroughly. Then apply another coat of paste, and upon this place wall paper of any desired kind. In order to protect the wall paper from wear, give it 2 or more coats of a solution of 8⅘ ounces white glue in 2.11 quarts hot water, allow them to dry, and finish the job with a coating of hard oil varnish.

METALLIC PAPER.

This paper, made by transferring, pasting, or painting a coating of metal on ordinary paper, retains a comparatively dull and dead appearance even after glazing or polishing with the burnisher or agate. Galvanized or electroplated metal paper, on the other hand, in which the metal has penetrated into the most minute pores of the paper, possesses an extraordinarily brilliant polish, fully equal to that of a piece of compact polished metal. It is much more extensively used than the kind first mentioned.

The following solutions are recommended for making "galvanized" metal paper:

I.—For silver paper: Twenty parts argento-cyanide of potassium; 13 parts cyanide of potassium; 980 parts water.

II.—For gold paper: Four parts auro-cyanide of potassium; 9 parts cyanide of potassium; 900 parts water.

Moth Paper.—

Naphthalene.....	4 ounces
Paraffine wax.....	8 ounces

Melt together and while warm paint unsized paper and pack away with the goods.

Lead Paper.—Lay rough drawing paper (such as contains starch) on an 8 per cent potassium iodide solution. After a moment take it out and dry. Next, in a dark room, float the paper face downward on an 8 per cent lead nitrate solution. This sensitizes the paper. Dry again. The paper is now ready for printing. This process should be carried on till all the detail is out in a grayish color. Then develop in a 10 per cent ammonium chloride solution. The tones obtained are of a fine blue black.

Aluminum Paper.—Aluminum paper is not leaf aluminum, but real paper glazed with aluminum powder. It is said to keep food materials fresh. The basic material is artificial parchment, coated with a solution of rosin in alcohol or ether. After drying, the paper is warmed until the rosin has again softened to a slight degree. The aluminum powder is dusted on and the paper then placed under heavy pressure to force the powder firmly into it. The metallic coating thus formed is not affected by air or greasy substances.

PAPER (ANTI-RUST) FOR NEEDLES:
See Rust Preventives.

PAPER CEMENTS:
See Adhesives.

PAPER DISINFECTANT:
See Disinfectants.

PAPER, FIREPROOF:
See Fireproofing.

PAPER, FROSTED:
See Glass (Frosted).

PAPER ON GLASS, TO AFFIX:
See Adhesives, under Water-Glass Cements.

PAPERS, IGNITING:
See Pyrotechnics.

PAPER ON METALLIC SURFACES, PASTING:
See Adhesives.

PAPER AS PROTECTION FOR IRON AND STEEL:
See Rust Preventives.

PAPERHANGERS' PASTES:
See Adhesives.

PAPER, PHOTOGRAPHIC:
See Photography.

PAPER VARNISHES:
See Varnishes.

PAPER WATERPROOFING:
See Waterproofing.

PAPIER MACHÉ:
See Paper.

PARAFFINE:

Rendering Paraffine Transparent.—A process for rendering paraffine and its mixtures with other bodies (ceresine, etc.) used in the manufacture of transparent candles consists essentially in adding a

naphthol, particularly beta-naphthol, to the material which is used for the manufacture of the candles, tapers, etc. The quantity added varies according to the material and the desired effect. One suitable mixture is made by heating 100 parts of paraffine and 2 parts of beta-naphthol at 175° to 195° F. The material can be colored in the ordinary way.

Removal of Dirt from Paraffine.—Filtration through felt will usually remove particles of foreign matter from paraffine. It may be necessary to use a layer of fine sand or of infusorial earth. If discolored by any soluble matter, try freshly heated animal charcoal. To keep the paraffine fluid, if a large quantity is to be handled, a jacketed funnel will be required, either steam or hot water being kept in circulation in the jacket.

Paraffine Scented Cakes.

Paraffine, 1 ounce; white petrolatum, 2 ounces; heliotropin, 10 grains; oil of bergamot, 5 drops; oil of lavender, 5 drops; oil of cloves, 2 drops. Melt the first two substances, then add the next, the oils last, and stir all until cool. After settling cut into blocks and wrap in tin foil. This is a disseminator of perfume. It perfumes where it is rubbed. It kills moths and perfumes the wardrobe. It is used by rubbing on cloth, clothes, and the handkerchief.

PARCHMENT AND PARCHMENT PAPER:
See Paper.

PARCHMENT CEMENT:
See Adhesives.

PARCHMENT PASTE:
See Adhesives.

PARFAITS:
See Ice Creams.

PARFAIT D'AMOUR CORDIAL:
See Wines and Liquors.

PARIS GREEN:
See Pigments.

PARIS RED:
See Polishes.

PARIS SALTS:
See Disinfectants.

PARISIAN CEMENT:
See Adhesives.

PASSE-PARTOUT FRAMING.

It is hardly correct to call the passe-partout a frame, as it is merely a binding together of the print, the glass, and the backing with a narrow edge of paper. This simple arrangement lends to the picture when complete a much greater finish and a more important appearance than might be anticipated

In regard to the making of a passe-partout frame, the first thing is to decide as to the width of the mount or matt to be used. In some cases, of course, the print is framed with no mount being visible; but, unless the picture is of large size, it will usually be found more becoming to have one, especially should the wall paper be of an obtrusive design. When the print and mount are both neatly trimmed to the desired size, procure a piece of clear white picture glass—most amateur framers will have discovered that there is a variance in the quality of this—and a piece of stout cardboard, both of exactly the same dimensions as the picture. Next prepare or buy the paper to be used for binding the edges together. This may now be bought at most all stationery stores in a great variety of colors. If it is prepared at home a greater choice of colors is available, and it is by no means a difficult task with care and sharp scissors. The tint should be chosen to harmonize with the print and the mount, taking also into consideration the probable surroundings—brown for photographs of brown tone, dark gray for black, pale gray for lighter tones; dark green is also a good color. All stationers keep colored papers suitable for the purpose, while plain wall papers or thin brown paper answers equally well.

Cut the paper, ruling it carefully, into even strips an inch wide, and then into four pieces, two of them the exact length of the top and bottom of the frame, and the other two half an inch longer than the two sides. Make sure that the print is evenly sandwiched between the glass and the back. Cut some tiny strips of thin court-plaster, and with these bind the corners tightly together. Brush over the two larger pieces of paper with mountant, and with them bind tightly together the three thicknesses—print, glass, and cardboard—allowing the paper to project over about a third of an inch on the face side, and the ends which were left a little longer must be neatly turned over and stuck at the back. Then, in the same manner, bind the top and bottom edges together, mitering the corners neatly.

It should not be forgotten, before binding the edges together, to make two slits in the cardboard back for the pur-

pose of inserting little brass hangers, having flat ends like paper fasteners, which may be bought for the purpose; or, where these are not available, two narrow loops of tape may be used instead, sticking the ends firmly on the inside of the cardboard by means of a little strong glue.

These are the few manipulations necessary for the making of a simple passe-partout frame, but there are numberless variations of the idea, and a great deal of variety may be obtained by means of using different mounts. Brown paper answers admirably as a mount for some subjects, using strips of paper of a darker shade as binding. A not too obtrusive design in pen and ink is occasionally drawn on the mount, while a more ambitious scheme is to use paint and brushes in the same way. An ingenious idea which suits some subjects is to use a piece of hand-blocked wall paper as a mount.

PARQUET POLISH:
See Polishes.

PASTES:
See Adhesives for Adhesive Purposes.

Pastes, Razor.—I.—From jewelers' rouge, plumbago, and suet, equal parts, melted together and stirred until cold.

II.—From prepared putty powder (levigated oxide of tin), 3 parts; lard, 2 parts; crocus martis, 1 part; triturated together.

III.—Prepared putty powder, 1 ounce; powdered oxalic acid, ¼ ounce; powdered gum, 20 grains; make a stiff paste with water, quantity sufficient, and evenly and thinly spread it over the strop, the other side of which should be covered with any of the common greasy mixtures. With very little friction this paste gives a fine edge to the razor, and its action is still further increased by slightly moistening it, or even breathing on it. Immediately after its use, the razor should receive a few turns on the other side of the strop.

PASTE FOR PAPER:
See Paper.

PASTES FOR POLISHING METALS:
See Soaps.

PASTEBOARD CEMENT:
See Adhesives.

PASTEBOARD DEODORIZERS:
See Household Formulas.

PASTILLES, FUMIGATING:
See Fumigants.

PATINAS:
See Bronzing and Plating.

PATENT LEATHER:
See Leather.

PEACH EXTRACT:
See Essences and Extracts.

PEARLS, TO CLEAN:
See Cleaning Preparations and Methods.

PEGAMOID.

Camphor, 100 parts; mastic, 100 parts; bleached shellac, 50 parts; gun cotton, 200 parts; acetone, 200 parts; acetic ether, 100 parts; ethylic ether, 50 parts.

This is used by bookbinders to glaze and harden the cardboard used for covers.

PELLETS FOR TOOTH-ACHE:

Paraffine wax	47 grains
Burgundy pitch	400 grains
Oil cloves	15 minums
Creosote	15 minums

Melt the wax and the Burgundy pitch together and when nearly cool, add the oil of cloves and creosote. Stir in thoroughly. When congealed roll into pill-like masses and wrap in bits of wax paper. Press one of these pellets into cavity of aching tooth which will stop pain at once.

PERCENTAGE SOLUTION.

Multiply the percentage by 5; the product is the number of grains to be added to an ounce of water to make a solution of the desired percentage. This is correct for anything less than 15 per cent.

Perfumes

DRY PERFUMES:

Sachet Powders.—

I.—	Orris root.....	6 ounces
	Lavender flowers...	2 ounces
	Talcum.....	4 drachms
	Musk.....	20 grains
	Terpinol.....	60 grains
II.—	Orange peel.....	2 ounces
	Orris root.....	1 ounce
	Sandalwood.....	4 drachms
	Tonka.....	2 drachms
	Musk.....	6 grains

Lavender Sachets.—

I.—Lavender flowers... 16 ounces
Gum benzoin..... 4 ounces
Oil lavender..... 2 drachms

II.—Lavender flowers, 150 parts; orris root, 150 parts; benzoin, 150 parts; Tonka beans, 150 parts; cloves, 100 parts; "Neugenwerz," 50 parts; sandalwood, 50 parts; cinnamon, 50 parts; vanilla, 50 parts; and musk, ½ part. All is bruised finely and mixed.

Violet Sachet.—

Powdered orris root 500 parts
Rice flour..... 250 parts
Essence bouquet... 10 parts
Spring flowers extract..... 10 parts
Violet extract..... 20 parts
Oil of bergamot... 4 parts
Oil of rose..... 2 parts

Borated Talcum.—

I.—Purified talcum, N. F..... 2 pounds
Powdered boric acid 1 ounce

To perfume add the following:

Powered orris root.. 1½ ounces
Extract jasmine.... 2 drachms
Extract musk..... 1 drachm

II.—A powder sometimes dispensed under this name is the salicylated powder of talcum of the National Formulary, which contains in every 1,000 parts 30 parts of salicylic acid and 100 parts of boric acid.

Rose.—

I.—Cornstarch..... 9 pounds
Powdered talc..... 1 pound
Oil of rose..... 80 drops
Extract musk..... 2 drachms
Extract jasmine.... 6 drachms

II.—Potato starch..... 9 pounds
Powdered talc..... 1 pound
Oil rose..... 45 drops
Extract jasmine.... ½ ounce

Rose Talc.—

I.—Powdered talc..... 5 pounds
Oil rose..... 50 drops
Oil wintergreen.... 4 drops
Extract jasmine.... 2 ounces

II.—Powdered talc..... 5 pounds
Oil rose..... 32 drops
Oil jasmine..... 4 ounces
Extract musk..... 1 ounce

Violet Talc.—

I.—Powdered talc..... 14 ounces
Powdered orris root. 2 ounces
Extract cassie..... ½ ounce
Extract jasmine..... ¼ ounce
Extract musk..... 1 drachm

II.—Starch..... 5,000 parts
Orris root..... 1,000 parts
Oil of lemon..... 14 parts
Oil of bergamot.. 14 parts
Oil of clove..... 4 parts

Smelling Salts.—I.—Fill small glasses having ground stopper with pieces of sponge free from sand and saturate with a mixture of spirit of sal ammoniac (0.910), 9 parts, and oil of lavender, 1 part. Or else fill the bottles with small dice of ammonium sesquicarbonate and pour the above mixture over them.

II.—Essential oil of lavender..... 18 parts
Attar of rose..... 2 parts
Ammonium carbonate..... 480 parts

Violet Smelling Salts.—I.—Moisten coarsely powdered ammonia carbonate, contained in a suitable bottle, with a mixture of concentrated tincture of orris root, 2½ ounces; aromatic spirit of ammonia, 1 drachm; violet extract, 3 drachms.

II.—Moisten the carbonate, and add as much of the following solution as it will absorb: Oil of orris, 5 minims; oil of lavender flowers, 10 minims; violet extract, 30 minims; stronger water of ammonia, 2 fluidounces.

To Scent Advertising Matter, etc.—The simplest way of perfuming printed matter, such as calendars, cards, etc., is to stick them in strongly odorous sachet powder. Although the effect of a strong perfume is obtained thereby, there is a large loss of powder, which clings to the printed matter. Again, there are often little spots which are due to the essential oils added to the powder.

Another way of perfuming, which is used especially in France for scenting cards and other articles, is to dip them in very strong "extraits d'odeur," leaving them therein for a few days. Then the cards are taken out and laid between filtering paper, whereupon they are pressed vigorously, which causes them not only to dry, but also to remain straight. They remain under strong pressure until completely dry.

Not all cardboard, however, can be subjected to this process, and in its choice one should consider the perfuming operation to be conducted. Nor can the cards be glazed, since spirit dissolves the glaze. It is also preferable to have lithographed text on them, since in the case of ordinary printing the letters often partly disappear or the colors are changed.

For pocket calendars, price lists, and voluminous matter containing more leaves than one, another process is recommended. In a tight closet, which should be lined with tin, so that little air can enter, tables composed of laths are placed on which nets stretched on frames are laid. Cover these nets with tissue paper, and proceed as follows: On the bottom of the closet sprinkle a strongly odorous and reperfumed powder; then cover one net with the printed matter to be perfumed and shove it to the closet on the lath. The next net again receives powder, the following one printed matter, and so on until the closet is filled. After tightly closing the doors, the whole arrangement is left to itself. This process presents another advantage in that all sorts of residues may be employed for scenting, such as the filters of the odors and infusions, residues of musk, etc. These are simply laid on the nets, and will thus impart their perfume to the printed matter.

Such a scenting powder is produced as follows:

	By weight
Iris powder, finely ground	5,000 parts
Residues of musk	1,000 parts
Ylang-ylang oil	10 parts
Bergamot oil	50 parts
Artificial musk	2 parts
Ionone	2 to 5 parts
Tincture of benzoin	100 parts

The powder may subsequently be employed for filling cheap sachets, etc.

LIQUID PERFUMES:

Coloring Perfumes.—Chlorophyll is a suitable agent for coloring liquid perfumes green. Care must be taken to procure an article freely soluble in the menstruum. As found in the market it is prepared (in form of solutions) for use in liquids strongly alcoholic; in water or weak alcohol; and in oils. Aniline greens of various kinds will answer the same purpose, but in a trial of any one of these it must be noted that very small quantities should be used, as their tinctorial power is so great that liquids in which they are incautiously used may stain the handkerchief.

Color imparted by chlorophyll will be found fairly permanent; this term is a relative one, and not too much must be expected. Colors which may suffer but little change by long exposure to diffused light may fade perceptibly by short exposure to the direct light of the sun.

Chlorophyll may be purchased or it may be prepared as follows: Digest leaves of grass, nettles, spinach, or other green herb in warm water until soft; pour off the water and crush the herb to a pulp. Boil the pulp for a short time with a half per cent solution of caustic soda, and afterwards precipitate the chlorophyll by means of dilute hydrochloric acid; wash the precipitate thoroughly with water, press and dry it, and use as much for the solution as may be necessary. Or a tincture made from grass as follows may be employed:

Lawn grass, cut fine	2 ounces
Alcohol	16 ounces

Put the grass in a wide-mouthed bottle, and pour the alcohol upon it. After standing a few days, agitating occasionally, pour off the liquid. The tincture may be used with both alcoholic and aqueous preparations.

Among the anilines, spirit soluble malachite green has been recommended.

A purple or violet tint may be produced by using tincture of litmus or ammoniated cochineal coloring. The former is made as follows:

Litmus	2½ ounces
Boiling water	16 ounces
Alcohol	3 ounces

Pour the water upon the litmus, stir well, allow to stand for about an hour, stirring occasionally, filter, and to the filtrate add the alcohol.

The aniline colors "Paris violet" or methyl violet B may be similarly employed. The amount necessary to produce a desired tint must be worked out by experiment. Yellow tints may best be imparted by the use of tincture of turmeric or saffron, fustic, quercitron, etc.

If a perfumed spirit, as, for instance, a mouth wash, is poured into a wineglassful of water, the oils will separate at once and spread over the surface of the water. This liquid being allowed to stand uncovered, one oil after another will evaporate, according to the degree of its volatility, until at last the least volatile remains behind.

This process sometimes requires weeks, and in order to be able to watch the separate phases of this evaporation correctly, it is necessary to use several glasses and to conduct the mixtures at certain intervals. The glasses must be numbered according to the day when set up, so that they may be readily identified.

If we assume, for example, that a mouth wash is to be examined, we may probably prepare every day for one week a mixture of about 100 grams of water and 10 drops of the respective liquid. Hence, after a lapse of 7 days

we will have before us 7 bouquets, of different odor, according to the volatility of the oils contained in them. From these different bouquets the qualitative composition of the liquid may be readily recognized, provided that one is familiar enough with the character of the different oils to be able to tell them by their odors.

The predominance of peppermint oil—to continue with the above example—will soon be lost and other oils will rise one after the other, to disappear again after a short time, so that the 7 glasses afford an entire scale of characteristic odors, until at last only the most lasting are perceptible. Thus it is possible with some practice to tell a bouquet pretty accurately in its separate odors.

In this manner interesting results are often reached, and with some perseverance even complicated mixtures can be analyzed and recognized in their distinctiveness. Naturally the difficulty in recognizing each oil is increased in the case of oils whose volatility is approximately the same. But even in this case changes, though not quite so marked, can be determined in the bouquet.

In a quantitative respect this method also furnishes a certain result as far as the comparison of perfumed liquids is concerned.

According to the quantity of the oils present the dim zone on the water is broader or narrower, and although the size of this layer may be changed by the admixture of other substances, one gains an idea regarding the quantity of the oils by mere smelling. It is necessary, of course, to choose glasses with equally large openings and to count out the drops of the essence carefully by means of a dropper.

When it is thought that all the odors have been placed, a test is made by preparing a mixture according to the recipe resulting from the trial.

Not pure oils, always alcoholic dilutions in a certain ratio should be used, in order not to disturb the task by a surplus of the different varieties, since it is easy to add more, but impossible to take away.

It is true this method requires patience, perseverance, and a fine sense of smell. One smelling test should not be considered sufficient, but the glasses should be carried to the nose as often as possible.

Fixing Agents in Perfumes.—The secret of making perfumery lies mainly in the choice of the fixing agents—i. e., those bodies which intensify and hold the floral odors. The agents formerly employed were musk, civet, and ambergris, all having a heavy and dull animal odor, which is the direct antithesis of a floral fragrance. A free use of these bodies must inevitably mean a perfume which requires a label to tell what it is intended for, to say nothing of what it is. To-day there is no evidence that the last of these (ambergris) is being used at all in the newer perfumes, and the other two are employed very sparingly, if at all. The result is that the newer perfumes possess a fragrance and a fidelity to the flowers that they imitate which is far superior to the older perfumes. Yet the newer perfume is quite as prominent and lasting as the old, while it is more pleasing. It contains the synthetic odors, with balsams or rosinous bodies as fixatives, and employs musk and civet only in the most sparing manner in some of the more sensitive odors. As a fixing agent benzoin is to be recommended. Only the best variety should be used, the Siamese, which costs 5 or 6 times as much as that from Sumatra. The latter has a coarse pungent odor.

Musk is depressing, and its use in cologne in even the minutest quantity will spoil the cologne. The musk lingers after the lighter odors have disappeared, and a sick person is pretty sure to feel its effects. Persons in vigorous health will not notice the depressing effects of musk, but when lassitude prevails these are very unpleasant. Moreover, it is not a necessity in these toilet accessories, either as a blending or as a fixing agent. Its place is better supplied by benzoin for both purposes.

As to alcohol, a lot of nonsense has been written about the necessity of extreme care in selecting it, such as certain kinds requiring alcohol made from grapes and others demanding extreme purification, etc. A reasonable attention to a good quality of alcohol, even at a slight increase in cost, will always pay, but, other things being equal, a good quality of oils in a poor quality of alcohol will give far better satisfaction than the opposite combination. The public is not composed of exacting connoisseurs, and it does not appreciate extreme care or expense in either particular. A good grade of alcohol, reasonably free from heavy and lingering foreign odors, will answer practically all the requirements.

General Directions for Making Perfumes.—It is absolutely essential for obtaining the best results to see that all vessels are perfectly clean. Always employ alcohol, 90 per cent, deodorized by

means of charcoal. When grain musk is used as an ingredient in liquid perfumes, first rub down with pumice stone, then digest in a little *hot* water for 2 or 3 hours; finally add to alcohol. The addition of 2 or 3 minims of acetic acid will improve the odor and also prevent accumulation of NH_3. Civet and ambergris should also be thoroughly rubbed down with some coarse powder, and transferred directly to alcohol.

Seeds, pods, bark rhizomes, etc., should be cut up in small pieces or powdered.

Perfumes improve by storing. It is a good plan to tie over the mouth of the containing vessel some fairly thick porous material, and to allow the vessel to stand for a week or two in a cool place, instead of corking at once.

It is perhaps unnecessary to add that as large a quantity as possible should be decanted, and then the residue filtered. This obviously prevents loss by evaporation. Talc or kieselguhr (amorphous SiO_2) are perhaps the best substances to add to the filter in order to render liquid perfumes bright and clear, and more especially necessary in the case of aromatic vinegars.

The operations involved in making perfumes are simple; the chief thing to be learned, perhaps, is to judge of the quality of materials.

The term "extract," when used in most formulas, means an alcoholic solution of the odorous principles of certain flowers obtained by enfluerage; that is, the flowers are placed in contact with prepared grease which absorbs the odorous matter, and this grease is in turn macerated with alcohol which dissolves out the odor. A small portion of the grease is taken up also at ordinary temperatures; this is removed by filtering the "extract" while "chilled" by a freezing mixture. The extracts can be either purchased or made directly from the pomade (as the grease is called). To employ the latter method successfully some experience may be necessary.

The tinctures are made with 95 per cent deodorized alcohol, enough menstruum being added through the marc when filtering to bring the finished preparation to the measure of the menstruum originally taken.

The glycerine is intended to act as a "fixing" agent—that is, to lessen the volatility of the perfumes.

Tinctures for Perfumes.—

a. Ambergris, 1 part; alcohol, 96 per cent, 15 parts.

b. Benzoin, Sumatra, 1 part; alcohol, 96 per cent, 6 parts.

c. Musk, 1 part; distilled water, 25 parts; spirit, 96 per cent, 25 parts.

d. Musk, 1 part; spirit, 96 per cent, 50 parts; for very oleiferous compositions.

e. Peru balsam, 1 part in spirit, 96 per cent, 7 parts; shake vigorously.

f. Storax, 1 part in spirit, 96 per cent, 15 parts.

g. Powdered Tolu balsam, 1 part; spirit, 96 per cent, 6 parts.

h. Chopped Tonka beans, 1 part; spirit, 60 per cent, 6 parts; for compositions containing little oil.

i. Chopped Tonka beans, 1 part; spirit, 96 per cent, 6 parts; for compositions containing much oil.

j. Vanilla, 1 part; spirit, 60 per cent, 6 parts; for compositions containing little oil.

k. Vanilla, 1 part; spirit, 96 per cent, 6 parts; for compositions containing much oil.

l. Vanillin, 20 parts; spirit, 96 per cent, 4,500 parts.

m. Powdered orris root, 1 part; spirit, 96 per cent, 5 parts.

n. Grated civet, 1 part in spirit, 96 per cent, 10 parts.

Bay Rum.—Bay rum, or more properly bay spirit, may be made from the oil with weak alcohol as here directed:

I.—		
Oil of bay leaves	3	drachms
Oil of orange peel	½	drachm
Tincture of orange peel	2	ounces
Magnesium carbonate	½	ounce
Alcohol	4	pints
Water	4	pints

Triturate the oils with the magnesium carbonate, gradually adding the other ingredients previously mixed, and filter.

The tincture of orange peel is used chiefly as a coloring for the mixture.

Oil of bay leaves as found in the market varies in quality. The most costly will presumably be found the best, and its use will not make the product expensive. It can be made from the best oil and deodorized alcohol and still sold at a moderate price with a good profit.

Especial care should be taken to use only perfectly fresh oil of orange peel. As is well known, this oil deteriorates rapidly on exposure to the air, acquiring an odor similar to that of turpentine. The oil should be kept in bottles of such size that when opened the contents can be all used in a short time.

II.—Bay oil, 15 parts; sweet orange oil, 1 part; pimento oil, 1 part; spirit of wine, 1,000 parts; water, 750 parts; soap spirit or quillaia bark, ad libitum.

III.—Bay oil, 12.5 parts; sweet orange oil, 0.5 part; pimento oil, 0.5 part; spirit of wine, 200 parts; water, 2,800 parts; Jamaica rum essence, 75 parts; soap powder, 20 parts; quillaia extract, 5 parts; borax, 10 parts; use sugar color.

Colognes.—In making cologne water, the alcohol used should be that obtained from the distillation of wine, provided a first-class article is desired. It is possible, of course, to make a good cologne with very highly rectified and deodorized corn or potato spirits, but the product never equals that made from wine spirits. Possibly the reason for this lies in the fact that the latter always contains a varying amount of oenanthic ether.

I.—Oil of bergamot..	10 parts
Oil of neroli.....	15 parts
Oil of citron.....	5 parts
Oil of cedrat.....	5 parts
Oil of rosemary...	1 part
Tincture of ambergris.....	5 parts
Tincture of benzoin.....	5 parts
Alcohol.....	1,000 parts

II.—The following is stated to be the "original" formula:

Oil of bergamot.	96 parts
Oil of citron	96 parts
Oil of cedrat....	96 parts
Oil of rosemary.	48 parts
Oil of neroli.....	48 parts
Oil of lavender..	48 parts
Oil of cavella....	24 parts
Absolute alcohol.	1,000 parts
Spirit of rosemary.....	25,000 parts

III.—

Alcohol, 90 per cent.....	5,000 parts
Bergamot oil.....	220 parts
Lemon oil.....	75 parts
Neroli oil.....	20 parts
Rosemary oil.....	5 parts
Lavender oil, French.....	5 parts

The oils are well dissolved in spirit and left alone for a few days with frequent shaking. Next add about 40 parts of acetic acid and filter after a while.

IV.—

Alcohol, 90 per cent.....	5,000 parts
Lavender oil, French.....	35 parts
Lemon oil.....	30 parts
Portugallo oil....	30 parts
Neroli oil.....	15 parts
Bergamot oil.....	15 parts
Petit grain oil....	4 parts
Rosemary oil.....	4 parts
Orange water....	700 parts

Cologne Spirits or Deodorized Alcohol.—This is used in all toilet preparations and perfumes. It is made thus:

Alcohol, 95 per cent..	1 gallon
Powdered unslaked lime.....	4 drachms
Powdered alum	2 drachms
Spirit of nitrous ether	1 drachm

Mix the lime and alum, and add them to the alcohol, shaking the mixture well together; then add the sweet spirit of niter and set aside for 7 days, shaking occasionally; finally filter.

Florida Waters.—

Oil of bergamot...	3	fluidounces
Oil of lavender ...	1	fluidounce
Oil of cloves.....	1¼	fluidrachms
Oil of cinnamon ..	2½	fluidrachms
Oil of neroli.....	½	fluidrachm
Oil of lemon	1	fluidounce
Essence of jasmine	6	fluidounces
Essence of musk..	2	fluidounces
Rose water.....	1	pint
Alcohol.....	8	pints

Mix, and if cloudy, filter through magnesium carbonate.

Lavender Water.—This, the most famous of all the perfumed waters, was originally a distillate from a mixture of spirit and lavender flowers. This was the perfume. Then came a compound water, or "palsy water," which was intended strictly for use as a medicine, but sometimes containing ambergris and musk, as well as red sanders wood. Only the odor of the old compound remains to us as a perfume, and this is the odor which all perfume compounders endeavor to hit. The most important precaution in making lavender water is to use well-matured oil of lavender. Some who take pride in this perfume use no oil which is less than 5 years old, and which has had 1 ounce of rectified spirit added to each pound of oil before being set aside to mature. After mixing, the perfume should stand for at least a month before filtering through gray filtering paper. This may be taken as a general instruction:

I.—Oil of lavender.....	1½	ounces
Oil of bergamot	4	drachms
Essence ambergris..	4	drachms
Proof spirit.....	3	pints

II.—English oil of lavender	1	ounce
Oil of bergamot	1½	drachms
Essence of musk (No. 2)	½	ounce
Essence of ambergris	½	ounce
Proof spirit	2	pints
III.—English oil of lavender	½	ounce
Oil of bergamot	2	drachms
Essence of ambergris	1	drachm
Essence of musk (No. 1)	3	drachms
Oil of angelica	2	minims
Attar of rose	6	minims
Proof spirit	1	pint
IV.—Oil of lavender	4	ounces
Grain musk	15	grains
Oil of bergamot	2½	ounces
Attar of rose	1½	drachms
Oil of neroli	½	drachm
Spirit of nitrous ether	2½	ounces
Triple rose water	12	ounces
Proof spirit	5	pints

Allow to stand 5 weeks before filtering.

LIQUID PERFUMES FOR THE HANDKERCHIEF, PERSON, ETC.:

Acacia Extract.—

French acacia	400	parts
Tincture of amber (1 in 10)	3	parts
Eucalyptus oil	0.5	parts
Lavender oil	1	part
Bergamot oil	1	part
Tincture of musk	2	parts
Tincture of orris root	150	parts
Spirit of wine, 80 per cent	500	parts

Bishop Essence.—

Fresh green peel of unripe oranges	60.0	grams
Curaçao orange peel	180.0	grams
Malaga orange peel	90.0	grams
Ceylon cinnamon	2.0	grams
Cloves	7.5	grams
Vanilla	11.0	grams
Orange flower oil	4	drops
Spirit of wine	1,500.0	grams
Hungarian wine	720.0	grams

A dark-brown tincture of pleasant taste and smell.

Caroline Bouquet.—

Oil of lemon	15	minims
Oil of bergamot	1	drachm
Essence of rose	4	ounces
Essence of tuberose	4	ounces
Essence of violet	4	ounces
Tincture of orris	2	ounces

Alexandra Bouquet.—

Oil of bergamot	3½	drachms
Oil of rose geranium	½	drachm
Oil of rose	½	drachm
Oil of cassia	15	minims
Deodorized alcohol	1	pint

Navy Bouquet.—

Spirit of sandalwood	10	ounces
Extract of patchouli	10	ounces
Spirit of rose	10	ounces
Spirit of vetivert	10	ounces
Extract of verbena	12	ounces

Bridal Bouquet.—Sandal oil, 30 minims; rose extract, 4 fluidounces; jasmine extract, 4 fluidounces; orange flower extract, 16 fluidounces; essence of vanilla, 1 fluidounce; essence of musk, 2 fluidounces; tincture of storax, 2 fluidounces. (The tincture of storax is prepared with liquid storax and alcohol [90 per cent], 1:20, by macerating for 7 days.)

Irish Bouquet.—

White rose essence	5,000	parts
Vanilla essence	450	parts
Rose oil	5	parts
Spirit	100	parts

Essence Bouquet.—

I.—Spirit	8,000	parts
Distilled water	2,000	parts
Iris tincture	250	parts
Vanilla herb tincture	100	parts
Benzoin tincture	40	parts
Bergamot oil	50	parts
Storax tincture	50	parts
Clove oil	15	parts
Palmarosa oil	12	parts
Lemon-grass oil	15	parts
II.—Extract of rose (2d)	64	ounces
Extract of jasmine (2d)	12	ounces
Extract of cassie (2d)	8	ounces
Tincture of orris (1 to 4)	64	ounces
Oil of bergamot	½	ounce
Oil of cloves	1	drachm
Oil of ylang-ylang	½	drachm
Tincture of benzoin (1 to 8)	2	ounces
Glycerine	4	ounces

Bouquet Canang.—

Ylang-ylang oil	45	minims
Grain musk	3	grains
Rose oil	15	minims
Tonka beans	3	
Cassie oil	5	minims
Tincture orris rhizome	1	fluidounce

Civet	1	grain
Almond oil	½	minim
Storax tincture	3	fluidrachms
Alcohol, 90 per cent	9	fluidounces

Mix, and digest 1 month. The above is a very delicious perfume.

Cassie oil or otto is derived from the flowers of *Acacia farnesiana Mimosa farnesiana*, L. (N. O. Leguminosæ, suborder Mimoseæ). It must not be confounded with cassia otto, the essential oil obtained from *Cinnamomum cassia.*

Cashmere Nosegay.—

I.—Essence of violet, from pomade	1	pint
Essence of rose, from pomade	1½	pints
Tincture of benzoin, (1 to 4)	½	pint
Tincture of civet (1 to 64)	¼	pint
Tincture of Tonka (1 to 4)	¼	pint
Benzoic acid	½	ounce
Oil of patchouli	¼	ounce
Oil of sandal	½	ounce
Rose water	½	pint
II.—Essence violet	120	ounces
Essence rose	180	ounces
Tincture benjamin (1 in 4)	60	ounces
Tincture civet (1 in 62)	30	ounces
Tincture Tonka (1 in 4)	30	ounces
Oil patchouli	3	ounces
Oil sandalwood	6	ounces
Rose water	60	ounces

Clove Pink.—

I.—Essence of rose	2	ounces
Essence of orange flower	6	ounces
Tincture of vanilla	3½	ounces
Oil of cloves	20	minims
II.—Essence of cassie	5	ounces
Essence of orange flower	5	ounces
Essence of rose	10	ounces
Spirit of rose	7	ounces
Tincture of vanilla	3	ounces
Oil of cloves	12	minims

Frangipanni.—

I.—Grain musk	10	grains
Sandal otto	25	minims
Rose otto	25	minims
Orange flower otto (neroli)	30	minims
Vetivert otto	5	minims
Powdered orris rhizome	½	ounce
Vanilla	30	grains
Alcohol (90 per cent)	10	fluidounces

Mix and digest for 1 month. This is a lasting and favorite perfume.

II.—Oil of rose	2	drachms
Oil of neroli	2	drachms
Oil of sandalwood	2	drachms
Oil of geranium (French)	2	drachms
Tincture of vetivert (1¼ to 8)	96	ounces
Tincture of Tonka (1 to 8)	16	ounces
Tincture of orris (1 to 4)	64	ounces
Glycerine	6	ounces
Alcohol	64	ounces

Handkerchief Perfumes.—

I.—Lavender oil	10	parts
Neroli oil	10	parts
Bitter almond oil	2	parts
Orris root	200	parts
Rose oil	5	parts
Clove oil	5	parts
Lemon oil	1	part
Cinnamon oil	2	parts

Mix with 2,500 parts of best alcohol, and after a rest of 3 days heat moderately on the water bath, and filter.

II.—Bergamot oil	10	parts
Orange peel oil	10	parts
Cinnamon oil	2	parts
Rose geranium oil	1	part
Lemon oil	4	parts
Lavender oil	4	parts
Rose oil	1	part
Vanilla essence	5	parts

Mix with 2,000 parts of best spirit, and after leaving undisturbed for 3 days, heat moderately on the water bath, and filter.

Honeysuckle.—

Oil of neroli	12	minims
Oil of rose	10	minims
Oil of bitter almond	8	minims
Tincture of storax	4	ounces
Tincture of vanilla	6	ounces
Essence of cassie	16	ounces
Essence of rose	16	ounces
Essence of tuberose	16	ounces
Essence of violet	16	ounces

Iridia.—

Coumarin	10	grains
Concentrated rose water (1 to 40)	2	ounces
Neroli oil	5	minims
Vanilla bean	1	drachm
Bitter almond oil	5	minims
Orris root	1	drachm
Alcohol	10	ounces

Macerate for a month.

Javanese Bouquet.—

Rose oil	15 minims
Pimento oil	20 minims
Cassia oil	3 minims
Neroli oil	3 minims
Clove oil	2 minims
Lavender oil	60 minims
Sandalwood oil	10 minims
Alcohol	10 ounces
Water	1½ ounces

Macerate for 14 days.

Lily Perfume.—

Essence of jasmine	1 ounce
Essence of orange flowers	1 ounce
Essence of rose	2 ounces
Essence of cassie	2 ounces
Essence of tuberose	8 ounces
Spirit of rose	1 ounce
Tincture of vanilla	1 ounce
Oil of bitter almond	2 minims

Lily of the Valley.—

I.—Acacia essence	750 parts
Jasmine essence	750 parts
Orange flower essence	800 parts
Rose flower essence	800 parts
Vanilla flower essence	1,500 parts
Bitter almond oil	15 parts
II.—Oil of bitter almond	10 minims
Tincture of vanilla	2 ounces
Essence of rose	2 ounces
Essence of orange flower	2 ounces
Essence of jasmine	2½ ounces
Essence of tuberose	2½ ounces
Spirit of rose	2½ ounces
III.—Extract rose	200 parts
Extract vanilla	200 parts
Extract orange	800 parts
Extract jasmine	600 parts
Extract musk tincture	150 parts
Neroli oil	10 parts
Rose oil	6 parts
Bitter almond oil	4 parts
Cassia oil	5 parts
Bergamot oil	6 parts
Tonka beans essence	150 parts
Linaloa oil	12 parts
Spirit of wine (90 per cent)	3,000 parts
IV.—Neroli extract	400 parts
Orris root extract	600 parts
Vanilla extract	400 parts
Rose extract	900 parts
Musk extract	200 parts
Orange extract	500 parts
Clove oil	6 parts
Bergamot oil	5 parts
Rose geranium oil	15 parts

Maréchal Niel Rose.—In the genus of roses, outside of the hundred-leaved or cabbage rose, the Maréchal Niel rose (Rosa Noisetteana Red), also called Noisette rose and often, erroneously, tea rose, is especially conspicuous. Its fine, piquant odor delights all lovers of precious perfumes. In order to reproduce the fine scent of this flower artificially at periods when it cannot be had without much expenditure, the following recipes will be found useful:

I.—Infusion rose I (from pomades)	1,000	parts
Genuine rose oil	10	parts
Infusion Tolu balsam	150	parts
Infusion genuine musk I	40	parts
Neroli oil	30	parts
Clove oil	2	parts
Infusion tubereuse I (from pomades)	1,000	parts
Vanillin	1	part
Coumarin	0.5	parts
II.—Triple rose essence	50	grams
Simple rose essence	60	grams
Neroli essence	30	grams
Civet essence	20	grams
Iris essence	30	grams
Tonka beans essence	20	grams
Rose oil	5	drops
Jasmine essence	60	grams
Violet essence	50	grams
Cassia essence	50	grams
Vanilla essence	45	grams
Clove oil	20	drops
Bergamot oil	10	drops
Rose geranium oil	20	drops

May Flowers.—

Essence of rose	10 ounces
Essence of jasmine	10 ounces
Essence of orange flowers	10 ounces
Essence of cassie	10 ounces
Tincture of vanilla	20 ounces
Oil of bitter almond	½ drachm

Narcissus.—

Caryophyllin	10 minims
Extract of tuberose	16 ounces
Extract of jasmine	4 ounces
Oil of neroli	20 minims
Oil of ylang-ylang	20 minims
Oil of clove	5 minims
Glycerine	80 minims

Almond Blossom.—

Extract of heliotrope	30 parts
Extract of orange flower	10 parts
Extract of jasmine	10 parts
Extract of rose	3 parts
Oil of lemon	1 part
Spirit of bitter almond, 10 per cent	6 parts
Deodorized alcohol	40 parts

Artificial Violet.—Ionone is an artificial perfume which smells exactly like fresh violets, and is therefore an extremely important product. Although before it was discovered compositions were known which gave fair imitations of the violet perfume, they were wanting in the characteristic tang which distinguishes all violet preparations. Ionone has even the curious property possessed by violets of losing its scent occasionally for a short time. It occasionally happens that an observer, on taking the stopper out of a bottle of ionone, perceives no special odor, but a few seconds after the stopper has been put back in the bottle, the whole room begins to smell of fresh violets. It seems to be a question of dilution. It is impossible, however, to make a usable extract by mere dilution of a 10 per cent solution of ionone.

It is advisable to make these preparations in somewhat large quantities, say 30 to 50 pounds at a time. This enables them to be stocked for some time, whereby they improve greatly. When all the ingredients are mixed, 10 days or a fortnight, with frequent shakings, should elapse before filtration. The filtered product must be kept in well-filled and well-corked bottles in a dry, dark, cool place, such as a well-ventilated cellar. After 5 or 6 weeks the preparation is ready for use.

Quadruple Extract.—	By weight
Jasmine extract, 1st pomade	100 parts
Rose extract, 1st pomade	100 parts
Cassia extract, 1st pomade	200 parts
Violet extract, 1st pomade	200 parts
Oil of geranium, Spanish	2 parts
Solution of vanillin, 10 per cent	10 parts
Solution of orris, 10 per cent	100 parts
Solution of ionone, 10 per cent	20 parts
Infusion of musk	10 parts
Infusion of orris from coarsely ground root	260 parts

Triple Extract.—	By weight
Cassia extract, 2d pomade	100 parts
Violet extract, 2d pomade	300 parts
Jasmine extract, 2d pomade	100 parts
Rose extract, 2d pomade	100 parts
Oil of geranium, African	1 part
Ionone, 10 per cent	15 parts
Solution of vanillin, 10 per cent	5 parts
Infusion of orris from coarse ground root	270 parts
Infusion of musk	10 parts

Double Extract.—	By weight
Cassia extract, 2d pomade	100 parts
Violet extract, 2d pomade	150 parts
Jasmine extract, 2d pomade	100 parts
Rose extract, 2d pomade	100 parts
Oil of geranium, reunion	2 parts
Ionone, 10 per cent	10 parts
Solution of vanillin, 10 per cent	10 parts
Infusion of ambrette	20 parts
Infusion of orris from coarse ground root	300 parts
Spirit	210 parts

White Rose.—

Rose oil	25 minims
Rose geranium oil	20 minims
Patchouli oil	5 minims
Ionone	3 minims
Jasmine oil (synthetic)	5 minims
Alcohol	10 ounces

Ylang-Ylang Perfume.—

I.—Ylang-ylang oil	10 minims
Neroli oil	5 minims
Rose oil	5 minims
Bergamot oil	3 minims
Alcohol	10 ounces

One grain of musk may be added.

II.—Extract of cassie (2d)	96 ounces
Extract of jasmine (2d)	24 ounces

Extract of rose	24 ounces
Tincture of orris	4 ounces
Oil of ylang-ylang	6 drachms
Glycerine	6 ounces

TOILET WATERS.

Toilet waters proper are perfumed liquids designed more especially as refreshing applications to the person—accessories to the bath and to the operations of the barber. They are used sparingly on the handkerchief also, but should not be of so persistent a character as the "extracts" commonly used for that purpose, as they would then be unsuitable as lotions.

Ammonia Water.—Fill a 6-ounce ground glass stoppered bottle with a rather wide mouth with pieces of ammonium carbonate as large as a marble, then drop in the following essential oils:

Oil of lavender	30 drops
Oil of bergamot	30 drops
Oil of rose	10 drops
Oil of cinnamon	10 drops
Oil of clove	10 drops

Finally fill the bottle with stronger water of ammonia, put in the stopper and let stand overnight.

Birch-Bud Water.—Alcohol (96 per cent), 350 parts; water, 70 parts; soft soap, 20 parts; glycerine, 15 parts; essential oil of birch buds, 5 parts; essence of spring flowers, 10 parts; chlorophyll, quantity sufficient to tint. Mix the water with an equal volume of spirit and dissolve the soap in the mixture. Mix the oil and other ingredients with the remainder of the spirit, add the soap solution gradually, agitate well, allow to stand for 8 days and filter. For use, dilute with an equal volume of water.

Carmelite Balm Water.—

Melissa oil	30 minims
Sweet marjoram oil	3 minims
Cinnamon oil	10 minims
Angelica oil	3 minims
Citron oil	30 minims
Clove oil	15 minims
Coriander oil	5 minims
Nutmeg oil	5 minims
Alcohol (90 per cent)	10 fluidounces

Angelica oil is obtained principally from the aromatic root of *Angelica archangelica*, L. (N. O. Umbelliferæ), which is commonly cultivated for the sake of the volatile oil which it yields.

Cypress Water.—

Essence of ambergris	½ ounce
Spirits of wine	1 gallon
Water	2 quarts

Distill a gallon.

Eau de Botot.—

Aniseed	80 parts
Clover	20 parts
Cinnamon cassia	20 parts
Cochineal	5 parts
Refined spirit	800 parts
Rose water	200 parts

Digest for 8 days and add

Tincture of ambergris	1 part
Peppermint oil	10 parts

Eau de Lais.—

Eau de cologne	1 part
Jasmine extract	0.5 parts
Lemon essence	0.5 parts
Balm water	0.5 parts
Vetiver essence	0.5 parts
Triple rose water	0.5 parts

Eau de Merveilleuse.—

Alcohol	3 quarts
Orange flower water	4 quarts
Peru balsam	2 ounces
Clove oil	4 ounces
Civet	1¼ ounces
Rose geranium oil	½ ounce
Rose oil	4 drachms
Neroli oil	4 drachms

Edelweiss.—

Bergamot oil	10 grams
Tincture of ambergris	2 grams
Tincture of vetiver (1 in 10)	25 grams
Heliotropin	5 grams
Rose oil spirit (1 in 100)	25 grams
Tincture of musk	5 drops
Tincture of angelica	12 drops
Neroli oil, artificial	10 drops
Hyacinth, artificial	15 drops
Jasmine, artificial	1 gram
Spirit of wine, 80 per cent	1,000 grams

Honey Water.—

I.—Best honey	1 pound
Coriander seed	1 pound
Cloves	1½ ounces
Nutmegs	1 ounce
Gum benjamin	1 ounce
Vanilloes, No. 4	1 drachm
The yellow rind of 3 large lemons.	

Bruise the cloves, nutmegs, coriander seed, and benjamin, cut the vanilloes in pieces, and put all into a glass alembic with 1 gallon of clean rectified spirit, and, after digesting 48 hours, draw off the spirit by distillation. To 1 gallon of the distilled spirit add

Damask rose water.	1½ pounds
Orange flower water	1½ pounds
Musk	5 grains
Ambergris	5 grains

Grind the musk and ambergris in a glass mortar, and afterwards put all together into a digesting vessel, and let them circulate 3 days and 3 nights in a gentle heat; then let all cool. Filter, and keep the water in bottles well stoppered.

II.—Oil of cloves	2½ drachms
Oil of bergamot	10 drachms
English oil of lavender	2½ drachms
Musk	4 grains
Yellow sandalwood.	2½ drachms
Rectified spirit	32 ounces
Rose water	8 ounces
Orange flower water	8 ounces
English honey	2 ounces

Macerate the musk and sandalwood in the spirit 7 days, filter, dissolve the oils in the filtrate, add the other ingredients, shake well, and do so occasionally, keeping as long as possible before filtering.

Lilac Water.—

Terpineol	2 drachms
Heliotropin	8 grains
Bergamot oil	1 drachm
Neroli oil	8 minims
Alcohol	12 ounces
Water	4 ounces

Orange Flower Water.—

Orange flower essence	8 ounces
Magnesium carbonate	1 ounce
Water	8 pints

Triturate the essence with the magnesium carbonate, add the water, and filter.

To Clarify Turbid Orange Flower Water.—Shake 1 quart of it with ¼ pound of sand which has previously been boiled out with hydrochloric acid, washed with water, and dried at red heat. This process doubtless would prove valuable for many other purposes.

Violet Waters.—

I.—Spirit of ionone, 10 per cent.	½ drachm
Distilled water	5 ounces
Orange flower water	1 ounce
Rose water	1 ounce
Cologne spirit	8 ounces

Add the spirit of ionone to the alcohol and then add the waters. Let stand and filter.

II.—Violet extract	2 ounces
Cassie extract	1 ounce
Spirit of rose	½ ounce
Tincture of orris	½ ounce
Green coloring, a sufficiency.	
Alcohol to 20 ounces.	

PERFUMED PASTILLES.

These scent tablets consist of a compressed mixture of rice starch, magnesium carbonate, and powdered orris root, saturated with heliotrope, violet, or lilac perfume.

Violet.—

Ionone	50 parts
Ylang-ylang oil	50 parts
Tincture of musk, extra strong	200 parts
Tincture of benzoin	200 parts

Heliotrope.—

Heliotropin	200 parts
Vanillin	50 parts
Tincture of musk	100 parts
Tincture of benzoin	200 parts

Lilac.—

Terpineol	200 parts
Muguet	200 parts
Tincture of musk	200 parts
Tincture of benzoin	200 parts

Sandalwood	2 drachms
Vetivert	2 drachms
Lavender flowers	4 drachms
Oil of thyme	½ drachm
Charcoal	2 ounces
Potassium nitrate	½ ounce
Mucilage of tragacanth, a sufficient quantity.	

Perfumes for Hair Oils.—

I.—Heliotropin	8 grains
Coumarin	1 grain
Oil of orris	1 drop
Oil of rose	15 minims
Oil of bergamot	30 minims
II.—Coumarin	2 grains
Oil of cloves	4 drops
Oil of cassia	4 drops
Oil of lavender flowers	15 minims
Oil of lemon	45 minims
Oil of bergamot	75 minims

Soap Perfumes.—

See also Soap.

I.—Oil of lavender	½ ounce
Oil of cassia	30 minims

Add 5 pounds of soap stock.

II.— Oil of caraway.....		
Oil of clove.....		
Oil of white thyme..	1½ drachms	
Oil of cassia.....	of	
Oil of orange leaf (neroli petit grain)	each	
Oil of lavender.....		

Add to 5 pounds of soap stock.

PEROXIDE OF HYDROGEN, TO MAKE:

Two ounces sodium perborate, 25 grains sodium bicarbonate are sufficient to make a gallon. Dissolve in gallon clear water and bottle in colored bottles with air-tight cork. This can be used to bleach ivory and bone.

Petroleum

(See also Oils.)

The Preparation of Emulsions of Crude Petroleum.—Kerosene has long been recognized as a most efficient insecticide, but its irritating action, as well as the very considerable cost involved, has prevented the use of the pure oil as a local application in the various parasitic skin diseases of animals.

In order to overcome these objections various expedients have been resorted to, all of which have for their object the dilution or emulsification of the kerosene. Probably the best known and most generally employed method for accomplishing this result is that which is based upon the use of soap as an emulsifying agent. The formula which is used almost universally for making the kerosene soap emulsion is as follows:

Kerosene.....	2 gallons
Water.....	1 gallon
Hard soap.....	½ pound

The soap is dissolved in the water with the aid of heat, and while this solution is still hot the kerosene is added and the whole agitated vigorously. The smooth white mixture which is obtained in this way is diluted before use with sufficient water to make a total volume of 20 gallons, and is usually applied to the skin of animals or to trees or other plants by means of a spray pump. This method of application is used because the diluted emulsion separates quite rapidly, and some mechanical device, such as a self-mixing spray pump, is required to keep the oil in suspension.

It will be readily understood that this emulsion would not be well adapted either for use as a dip or for application by hand, for in the one case the oil, which rapidly rises to the surface, would adhere to the animals when they emerged from the dipping tank and the irritating effect would be scarcely less than that produced by the plain oil, and in the second case the same separation of the kerosene would take place and necessarily result in an uneven distribution of the oil on the bodies of the animals which were being treated.

Within recent years it has been found that a certain crude petroleum from the Beaumont oil fields is quite effective for destroying the Texas fever cattle ticks. This crude petroleum contains from 40 to 50 per cent of oils boiling below 300° C. (572° F.), and from 1 to 1.5 per cent of sulphur. After a number of trials of different combinations of crude oil, soap, and water, the following formula was decided upon as the one best suited to the uses in view:

Crude petroleum.....	2 gallons
Water.....	½ gallon
Hard soap.....	½ pound

Dissolve the soap in the water with the aid of heat; to this solution add the crude petroleum, mix with a spray pump or shake vigorously, and dilute with the desired amount of water. Soft water should, of course, be used. Various forms of hard and soft soaps have been tried, but soap with an amount of free alkali equivalent to 0.9 per cent of sodium hydroxide gives the best emulsion. All the ordinary laundry soaps are quite satisfactory, but toilet soaps in the main are not suitable.

An emulsion of crude petroleum made according to this modified formula remains fluid and can be easily poured; it will stand indefinitely without any tendency toward a separation of the oil and water and can be diluted in any proportion with cold soft water. After sufficient dilution to produce a 10 per cent emulsion, a number of hours are required for all the oil to rise to the surface, but if the mixture is agitated occasionally, no separation takes place. After long standing the oil separates in the form of a creamlike layer which is easily mixed with the water again by stirring. It is therefore evident that for producing an emulsion which will hold the oil in suspension after dilution, the modified formula meets the desired requirements.

In preparing this emulsion for use in the field, a large spray pump capable of mixing 25 gallons may be used with perfect success.

In using the formula herewith given, it should be borne in mind that it is recommended especially for the crude

petroleum obtained from the Beaumont oil fields, the composition of which has already been given. As crude petroleums from different sources vary greatly in their composition, it is impracticable to give a formula that can be used with all crude oils. Nevertheless, crude petroleum from other sources than the Beaumont wells may be emulsified by modifying the formula given above. In order to determine what modification of this formula is necessary for the emulsification of a given oil, the following method may be used:

Dissolve ½ pound of soap in ½ gallon of hot water; to 1 measure of this soap solution add 4 measures of the crude petroleum to be tested and shake well in a stoppered bottle or flask for several minutes.

If, after dilution, there is a separation of a layer of pure oil within half an hour the emulsion is imperfect, and a modification of the formula will be required. To accomplish this the proportion of oil should be varied until a good result is obtained.

Petroleum for Spinning.—In order to be able to wash out the petroleum or render it "saponifiable," the following process is recommended: Heat the mineral oil with 5 to 10 per cent of olein, add the proper amount of alcoholic lye and continue heating until the solvent (water alcohol) evaporates. A practical way is to introduce an aqueous lye at 230° F. in small portions and to heat until the froth disappears. For clearness it is necessary merely to evaporate all the water. In the same manner, more olein may be added as desired if the admixture of lye is kept down so that not too much soap is formed or the petroleum becomes too thick. After cooling, a uniform gelatinous mass results. This is liquefied mechanically, during or after the cooling, by passing it through fine sieves. Soap is so finely and intimately distributed in the petroleum that the finest particles of oil are isolated by soap, as it were. When a quantity of oil is intimately stirred into the water an emulsion results so that the different parts cannot be distinguished. The same process takes place in washing, the soap contained in the oil swelling between the fibers and the oil particles upon mixture with water, isolating the oil and lifting it from the fiber.

Deodorized Petroleum.—Petroleum may be deodorized by shaking it first with 100 parts of chlorinated lime for every 4,500 parts, adding a little hydrochloric acid, then transferring the liquid to a vessel containing lime, and again shaking until all the chlorine is removed. After standing, the petroleum is decanted.

Petroleum Briquettes.—Mix with 1,000 parts of petroleum oil 150 parts of ground soap, 150 parts of rosin, and 300 parts of caustic soda lye. Heat this mixture while stirring. When solidification commences, which will be in about 40 minutes, the operation must be watched. If the mixture tends to overflow, pour into the receiver a few drops of soda, and continue to stir until the solidification is complete. When the operation is ended, flow the matter into molds for making the briquettes, and place them for 10 or 15 minutes in a stove; then they may be allowed to cool. The briquettes can be employed a few hours after they are made.

To the three elements constituting the mixture it is useful to add per 1,000 parts by weight of the briquettes to be obtained, 120 parts of sawdust and 120 parts of clay or sand, to render the briquettes more solid.

Experiments in the heating of these briquettes have demonstrated that they will furnish three times as much heat as briquettes of ordinary charcoal, without leaving any residue.

PETROLEUM EMULSION:
See Insecticides.

PETROLEUM JELLIES:
See Lubricants.

PETROLEUM SOAP:
See Soap.

PEWTER:
See Alloys.

PEWTER, TO CLEAN:
See Cleaning Preparations and Methods.

PEWTER, AGEING:

If it is desired to impart to modern articles of pewter the appearance of antique objects, plunge the pieces for several moments into a solution of alum to which several drops of hydrochloric or sulphuric acid have been added.

PICTURES, GLOW.

These can be easily produced by drawing the outlines of a picture, writing, etc., on a piece of white paper with a solution of 40 parts of saltpeter and 20 parts of gum arabic in 40 parts of warm water, using a writing pen for this purpose. All the lines must connect and one of them

must run to the edge of the paper, where it should be marked with a fine lead-pencil line. When a burning match is held to this spot, the line immediately glows on, spreading over the whole design, and the design formerly invisible finally appears entirely singed. This little trick is not dangerous.

PHOSPHATE SUBSTITUTE.

An artificial phosphate is thus prepared: Melt in an oven a mixture of 100 parts of phosphorite, ground coarsely, 70 parts of acid sulphate of soda; 20 parts of carbonate of lime; 22 parts of sand, and 607 parts of charcoal. Run the molten matter into a receiver filled with water; on cooling it will become granular. Rake out the granular mass from the water, and after drying, grind to a fine powder. The phosphate can be kept for a long time without losing its quality, for it is neither caustic nor hygroscopic. Wagner has, in collaboration with Dorsch, conducted fertilizing experiments for determining its value, as compared with superphosphate or with Thomas slag. The phosphate decomposes more rapidly in the soil than Thomas slag, and so far as the experiments have gone, it appears that the phosphoric acid of the new phosphate exercises almost as rapid an action as the phosphoric acid of the superphosphate soluble in water.

Photography

NEW DISCOVERIES IN PHOTOGRAPHY

Prepared by

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1612 Neptune Avenue, Brooklyn, N. Y.

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DEVELOPERS AND DEVELOPING OF PLATES.

No light is perfectly safe or non-actinic, even that coming through a combined ruby and orange window or lamp. Therefore use great care in developing.

A light may be tested this way: Place a dry plate in the plate holder in total darkness, draw the slide sufficiently to expose one-half of the plate, and allow the light from the window or lamp, 12 to 18 inches distant, to fall on this exposed half for 3 or 4 minutes. Then develop the plate the usual length of time in total darkness. If the light is safe, there will be no darkening of the exposed part. If not safe, the remedy is obvious.

The developing room must be a perfectly dark room, save for the light from a ruby- or orange-colored window (or combination of these two colors). Have plenty of pure running water and good ventilation.

Plates should always be kept in a dry room. The dark room is seldom a safe place for storage, because it is apt to be damp.

Various developing agents give different results. Pyrogallic acid in combination with carbonate of sodium or carbonate of potassium gives strong, vigorous negatives. Eikonogen and metol yield soft, delicate negatives. Hydrochinon added to eikonogen or metol produces more contrast or greater strength.

It is essential to have a bottle of bromide of potassium solution, 10 per cent, in the dark room. (One ounce of bromide of potassium, water to 10 ounces.) Overtimed plates may be much improved by adding a few drops of bromide solution to the developer as soon as the overtimed condition is apparent (a plate is overtimed when the image appears almost immediately, and then blackens all over).

Undertimed plates should be taken out of the developer and placed in a tray of water where no light can reach them. If the detail in the shadows begins to appear after half an hour or so, the plate can be replaced in the developer and development brought to a finish.

Quick development, with strong solutions, means a lack of gradation or half-tones.

A developer too warm or containing too much alkali (carbonate of sodium or potassium) will yield flat, foggy negatives.

A developer too cold is retarded in its action, and causes thin negatives.

Uniform temperature is necessary for uniform results.

If development is continued too long, the negative will be too dense.

In warm weather, the developer should be diluted; in cold weather, it should be stronger.

The negative should not be exposed to white light until fixation is complete.

The negative should be left fully 5 minutes longer in the fixing bath than is necessary to dissolve out the white bromide of silver.

In hot weather a chrome alum fixing bath should be used to prevent frilling.

Always use a fresh hypo or fixing bath. Hypo is cheap.

Plates and plate holders must be kept free from dust, or pinholes will result.

After the negative is fixed, an hour's washing is none too much.

The plate should be dried quickly in warm weather else the film will become dense and coarse-grained.

Do not expect clean, faultless negatives to come out of dirty developing and fixing solutions and trays.

Pyro and Soda Developer.—

I.—Pure water	30	ounces
Sulphite soda, crystals	5	ounces
Carbonate soda, crystals	2½	ounces
II.—Pure water	24	ounces
Oxalic acid	15	grains
Pyrogallic acid	1	ounce

To develop, take of

Solution No. I	1	ounce
Solution No. II	½	ounce
Pure water	3	ounces

More water may be used in warm weather and less in cool weather.

If solution No. I is made by hydrometer test, use equal parts of the following:

Sulphite soda testing, 80°.
Carbonate soda testing, 40°.

One ounce of this mixture will be equivalent to 1 ounce of solution No. I.

Pyro and Potassium Developer.—

I.—Pure water	32	ounces
Sulphite soda, crystals	8	ounces
Carbonate potassium, dry	1	ounce
II.—Pure water	24	ounces
Oxalic acid	15	ounces
Pyrogallic acid	1	ounce

To develop, take of

Solution No. I	1	ounce
Solution No. II	½	ounce
Pure water	3	ounces

When the plate is fully developed, if the lights are too thin, use less water in the developer; if too dense, use more water.

Pyro and Metol Developer.—Good for short exposures:

I.—Pure water	57	ounces
Sulphite soda, crystals	2½	ounces
Metol	1	ounce
II.—Pure water	57	ounces
Sulphite soda, crystals	2½	ounces
Pyrogallic acid	¼	ounce
III.—Pure water	57	ounces
Carbonate potassium	2½	ounces

To develop, take of

Pure water	3 ounces
Solution No. I	1 ounce
Solution No. II	1 ounce
Solution No. III	1 ounce

This developer may be used repeatedly by adding a little fresh developer as required.

Keep the used developer in a separate bottle.

Rodinal Developer.—One part rodinal to 30 parts pure water.

Use repeatedly, adding fresh as required.

Bromo-Hydrochinon Developer.—For producing great contrast and intensity, also for developing over-exposed plates.

I.—Distilled or ice water	25	ounces
Sulphite of soda, crystals	3	ounces
Hydrochinon	½	ounce
Bromide of potassium	¼	ounce

Dissolve by warming, and let cool before use.

II.—Water	25	ounces
Carbonate of soda, crystals	6	ounces

Mix Nos. I and II, equal parts, for use.

Eikonogen Hydrochinon Developer.—

I.—Distilled or pure well water	32	ounces
Sodium sulphite, crystals	4	ounces
Eikonogen	240	grains
Hydrochinon	60	grains
II.—Water	32	ounces
Carbonate of potash	4	ounces

To develop, take

No. I	2 ounces
No. II	1 ounce
*Water	1 ounce

*For double-coated plates use 5 ounces of water.

By hydrometer:

I.—Sodium sulphite. solution to test 30 — 34 ounces
Eikonogen — 240 grains
Hydrochinon — 60 grains

II.—Carbonate of potash solution to test 50 — .....

To develop, take

No. I — 2 ounces
No. II — 1 ounce
*Water — 1 ounce

Hydrochinon Developer.—

I.—Hydrochinon — 1 ounce
Sulphite of soda, crystals — 5 ounces
Bromide of potassium — 10 grains
Water (ice or distilled) — 55 ounces

II.—Caustic potash — 180 grains
Water — 10 ounces

To develop:

Take of I, 4 ounces; II, ½ ounce. After use pour into a separate bottle. This can be used repeatedly, and with uniformity of results, by the addition of 1 drachm of I and 10 drops of II to every 8 ounces of old developer.

In using this developer it is important to notice the temperature of the room, as a slight variation in this respect causes a very marked difference in the time it takes to develop, much more so than with pyro. The temperature of room should be from 70° to 75° F.

Metol Developer.—

I.—Water — 8 ounces
Metol — 100 grains
Sulphite of soda, crystals — 1 ounce

II.—Water — 10 ounces
Potassium carbonate — 1 ounce

Take equal parts of I and II and 6 parts of water. If more contrast is needed, take equal parts of I and II and 3 parts of water, with 5 drops to the ounce of a $\frac{1}{10}$ solution of bromide of potassium.

Metol and Hydrochinon Developer.—

I.—Pure hot water — 80 ounces
Metol — 1 ounce
Hydrochinon — ⅛ ounce
Sulphite soda, crystals — 6 ounces

II.—Pure water — 80 ounces
Carbonate soda, crystals — 5 ounces

To develop, take of

Pure water — 2 ounces
Solution No. I — 1 ounce
Solution No. II — 1 ounce

Metol-Bicarbonate Developer.—Thoroughly dissolve

Metol — 1 ounce
In water — 60 ounces

Then add

Sulphite of soda, crystals — 6 ounces
Bicarbonate of soda. — 3 ounces

To prepare with hydrometer, mix

Sulphite of soda solution, testing 75 — 30 ounces
Bicarbonate of soda solution, testing 50 — 30 ounces
Metol — 1 ounce

Dissolved in 12 ounces water.

Ferrous-Oxalate Developer.—For transparencies and opals.

I.—Oxalate of potash — 8 ounces
Water — 30 ounces
Citric acid — 60 grains
Citrate of ammonia solution — 2 ounces

II.—Sulphate of iron — 4 ounces
Water — 32 ounces
Sulphuric acid — 16 drops

III.—Citrate of ammonia solution saturated.

Dissolve 1 ounce citric acid in 5 ounces distilled water, add liquor ammonia until a slip of litmus paper just loses the red color, then add water to make the whole measure 8 ounces.

Add 1 ounce of II to 2 of I, and ½ ounce of water, and 3 to 6 drops of 10 per cent solution bromide potassium.

To develop, first rinse developing dish with water, lay film or plate down, and flow with sufficient developer to well cover. Careful attention must be given to its action, and when detail is just showing in the face, or half-tone lights in a view, pour off developer, and well wash the film before placing in the fixing bath.

Tolidol Developer.—Standard formula for dry plates and films:

Water — 16 ounces
Tolidol — 24 grains
Sodium sulphite — 72 (144) grains
Sodium carbonate — 96 (240) grains

The figures in parenthesis are for crystals. It will be seen that in every case

*For double-coated plates use 5 ounces of water.

the weight of sulphite required in crystals is double that of dry sulphite, while the weight of carbonate crystals is 2½ times as much as dry carbonate.

For tank development Dr. John M. Nicol recommends the standard formula diluted with 6 times the amount of water, and the addition of 1 drop of retarder to every ounce after dilution.

To obtain very strong negatives:

Water	16 ounces
Tolidol	50 to 65 grains
Sodium sulphite	80 (160) grains
Sodium carbonate	120 (300) grains

On some brands of plates the addition of a little retarder will be necessary.

If stock solutions are preferred, they may be made as follows:

Solution A

Water	32 ounces
Tolidol	1 ounce
Sodium sulphite	1 (2) ounce

Solution B

Water	32 ounces
Sodium sulphite	2 (4) ounces

Solution C

Water	32 ounces
Sodium carbonate	4 (10) ounces

If preferred, stock solutions *B* and *C* can be made by hydrometer, instead of by weight as above. The solutions will then show:

Solution B

Sodium sulphite	40

Solution C

Sodium carbonate	75

Or if potassium carbonate is preferred instead of sodium:

Solution C

Potassium carbonate	60

For standard formula for dry plates and films, mix

Solution *A*	1 part
Solution *B*	1 part
Solution *C*	1 part
Water	7 parts

For strong negatives (for aristo-platino):

Solution *A*	1½ to 2 parts
Solution *B*	1 part
Solution *C*	1 part
Water	4 to 4½ parts

For tank development:

Solution *A*	1 part
Solution *B*	1 part
Solution *C*	1 part
Water	35 parts

For developing paper:

Solution *A*	2 parts
Solution *B*	2 parts
Solution *C*	1 part

The reading of the hydrometer for stock solutions is the same whether dried chemicals or crystals are used. No water is used.

Pyrocatechin-Phosphate Developer.—

Solution A

Crystallized sulphite of soda	386 grains
Pyrocatechin	77 grains
Water	8 ounces

Solution B

Ordinary crystal phosphate of sodium	725 grains
Caustic soda (purified in sticks)	77 grains
Water	8 ounces

Mix 1 part of *A* with 1 part of *B* and from 1 to 3 parts of water. If the exposure is not absolutely normal we recommend to add to the above developer a few drops of a solution of bromide of potassium (1.10).

Pyrocatechin Developer (One Solution).—Dissolve in the following range:

Sulphite of soda crystallized	25½ drachms
Caustic soda (purified in sticks)	3½ drachms
Distilled water	14 ounces
Pyrocatechin	308 grains

The pyrocatechin must not be added until the sulphite and caustic soda are entirely dissolved. For use the concentrated developer is to be diluted with from 10 to 20 times as much water. The normal proportion is 1 part of developer in 15 parts of water.

Vogel's Pyrocatechin Combined Developer and Fixing Solution.—

Sulphite of soda crystallized	468 grains
Water	2⅝ ounces
Caustic potash (purified in sticks)	108 grains
Pyrocatechin	108 grains

Mix for a formally fixing plate of 5 x 7 inches.

Developer	3 drachms
Fixing soda solution (1:5)	5½ drachms
Water	1 ounce

The process of developing and fixing with this solution is accomplished in a

few minutes. The picture first appears usually, strengthens very quickly, and shortly after the fixing is entirely done.

Ellon's Pyrocatechin Developer.—Pyrocatechin, 2 per cent solution (2 grams pyrocatechin in 100 cubic centimeters of water).

Carbonate of potassium, 10 per cent solution (10 grams carbonate in 100 cubic centimeters of water).

For use take equal parts and add water as desired.

Imperial Standard Pyro Developer.—

I.—Metabisulphite of potassium	120 grains
Pyrogallic acid	55 grains
Bromide of potassium	20 grains
Metol	45 grains
Water	20 ounces
II.—Carbonate of soda	4 ounces
Water	20 ounces

For use mix equal parts I and II.

Bardwell's Pyro-Acetone Developer.—

Water	4 ounces
Sulphite of sodium (saturated solution)	4 drachms
Acetone	2 drachms
Pyro	10 grams

Hauff's Adurol Developer.—One solution.

Water	10 ounces
Sulphide of sodium, crystals	4 ounces
Carbonate of potassium	3 ounces
Adurol	½ ounce

For studio work and snap shots take 1 part with 3 parts water.

For time exposures out-door take 1 part with 5 parts water.

Glycin Developer.—

I.—Hot water	10 ounces
Sulphite of sodium, crystals	1¼ ounces
Carbonate of sodium	¼ ounce
Glycin	½ ounce

Add to water in order given.

II.—Water	10 ounces
Carbonate of potash	1¼ ounces

For normal exposure take I, 1 ounce; II, 2 ounces; water, 1 ounce.

Imogen Developer.—

I.—Hot water	9 ounces
Sulphite of sodium, crystals	385 grains
Imogen	123 grains
II.—Hot water	4½ ounces
Carbonate of sodium	2 ounces

For use take 2 ounces of I and 1 ounce of II.

Diogen Developer.—

Water	9 ounces
Sulphite of sodium	3½ ounces
Diogen	7 drachms
Carbonate of potassium	4½ ounces

For normal exposure take 4 drachms of this solution; dilute with 2 ounces, 1 drachm of water, and add 2 drops bromide of potassium, 10 per cent solution.

Ortol Developer.—Formula by Pentlarge.

I.—Water	1 ounce
Metabisulphite of potassium	4 grains
Ortol	8 grains
II.—Water	1 ounce
Sulphite of sodium	48 grains
Carbonate of potassium	16 grains
Carbonate of sodium	32 grains

For use take equal parts I and II, and an equal bulk of water.

Metacarbol Developer.—

Metacarbol	25 grains
Sulphite of soda, crystals	100 grains
Caustic soda	50 grains
Water	10 ounces

Dissolve the metacarbol in water, then add the sulphite, and when dissolved add the caustic soda and filter.

DEVELOPING POWDERS.

	By weight
I.—Pyrogallol	0.3 parts
Sodium bisulphite	1.2 parts
Sodium carbonate	1.2 parts
II.—Eikonogen	1.1 parts
Sodium sulphite	2.4 parts
Potassium carbonate	1.5 parts
III.—Hydroquinone	0.6 parts
Sodium sulphite	3.4 parts
Potassium bromide	0.3 parts
Sodium carbonate	7.0 parts

These three formulas each yield one powder. The powders should be put up in oiled paper, and carefully inclosed, besides, in a wrapper of black paper. For use, one powder is dissolved in about 60 parts of distilled water.

DEVELOPING PAPERS.

Light.—The paper can be safely handled 8 feet from the source of light,

which may be Welsbach gas light, covered with post-office paper, incandescent light, ordinary gas light, kerosene light, or reduced daylight, the latter produced by covering a window with one or more thicknesses of orange post-office paper, as necessitated by strength of light.

Expose by holding the printing frame close to gas, lamp, or incandescent light, or to subdued daylight. Artificial light is recommended in preference to daylight because of uniformity, and it being in consequence easier to judge the proper length of time to expose.

Exposure.—The amount of exposure required varies with the strength of the light; it takes about the same time with an ordinary gas burner and an incandescent light; a Welsbach gas light requires only about one-half as much time as the ordinary gas burner, and a kerosene light of ordinary size about three times as much as an ordinary gas burner. If daylight is to be used the window should be covered with post-office paper, in which a sub-window about 1 foot square for making the exposure may be made. Cover this window first with a piece of white tissue paper, then with a piece of black cloth or post-office paper to exclude the white light when not wanted. Make exposure according to strength of light at from 1 to 2 feet away from the tissue paper. Keep the printing frame when artificial light is used constantly in motion during exposure.

Timing the Exposure.—The time necessary for exposing is regulated by density of negative and strength of light. The further away the negative is from the source of light at the time of exposure the weaker the light; hence, in order to secure uniformity in exposure it is desirable always to make the exposure at a given distance from the light used. With a negative of medium density exposed 1 foot from an ordinary gas burner, from 1 to 10 minutes' exposure is required.

A test to ascertain the length of exposure should be made. Once the proper amount of exposure is ascertained with a given light, the amount of exposure required can be easily approximated by making subsequent exposures at the same distance from the same light; the only difference that it would then be necessary to make would be to allow for variation in density of different negatives.

Fixing.—Allow the prints to remain in the fixing solution 10 to 20 minutes, when they should be removed to a tray containing clear water.

Washing.—Wash 1 hour in running water, or in 10 or 12 changes of clear water, allowing prints to soak 2 to 3 minutes in each change.

Pyrocatechin Formula.—

Solution A

Pyrocatechin	2 parts
Sulphite of soda, crystals	2.5 parts
Water	100 parts

Solution B

Carbonate of soda	10 parts
Water	100 parts

Before using mix 20 parts of Solution *A*, and ½ part of Solution *B*.

Metol Quinol.—

Water	10 ounces
Metol	7 grains
Sodium sulphite, crystals, pure	½ ounce
Hydroquinone	30 grains
Sodium carbonate, dessicated (or 400 grains of crystallized carbonate)	200 grains
Ten per cent bromide of potassium solution, about	10 drops

Amidol Formula.—

Water	4 ounces
Sodium sulphite, crystals, pure	200 grains
Amidol, about	20 grains
Ten per cent bromide of potassium solution, about	5 drops

If the blacks are greenish, add more amidol; if whites are grayish, add more bromide of potassium.

Hypo-Acid Fixing Bath.—

Hypo	16 ounces
Water	64 ounces

Then add the following hardening solution:

Water	5 ounces
Sodium sulphite, crystals	½ ounce
Commercial acetic acid (containing 25 per cent pure acid)	3 ounces
Powdered alum	½ ounce

Amidol Developer.—

Amidol	2 grains
Sodium sulphite	30 grains
Potassium bromide	1 grain
Water	1 ounce

With a fairly correct exposure this will be found to produce prints of a rich black tone, and of good quality. The whole secret of successful bromide printing lies in correctness of exposure. It is generally taken for granted that any poor, flat negative is good enough to yield a bromide print, but this is not so. A negative of good printing quality on printing-out paper will also yield a good print on bromide paper, but considerable care and skill are necessary to obtain a good result from a poor negative. The above developer will not keep in solution, and should be freshly prepared as required. The same formula will also be found useful for the development of lantern plates, but will only yield black-toned slides.

PLATINUM PAPERS:

General Instructions.—To secure the most brilliant results the sensitized paper, before, during, and after its exposure to light, must be kept as dry as possible.

The paper is exposed to daylight, in the printing frame, for about one-third of the time necessary for ordinary silver paper.

The print is then immersed in the developer for about 30 seconds, then cleared in 3 acid baths containing 1 part of muriatic acid C. P. to 60 parts of water, washed for a short time in running water, the whole operation of printing, clearing, and washing being complete in about half an hour.

As a general rule all parts of the picture except the highest lights should be visible when the exposure is complete.

When examining the prints in the printing frames, care should be taken not to expose them unduly to light; for the degradation of the whites of the paper due to slight action of light is not visible until after development.

Ansco Platinum Paper.—Print until a trace of the detail *desired* is slightly visible in the high lights.

Development.—Best results are obtained with the temperature of the developer from 60° to 80° F. Immerse the print in the developer with a quick sweeping motion to prevent air bells. Develop in artificial or weak daylight. The development of a print from a normal negative will require 40 seconds or more.

Formula for Developer.—

Water	50 ounces
Neutral oxalate of potash	8 ounces
Potassium phosphate (monobasic)	1 ounce

Care must be used to obtain the monobasic potassium phosphate.

Immediately after prints are developed, place them face down in the first acid bath, composed of

Muriatic acid, C. P.	1 ounce
Water	60 ounces

After remaining in this bath for a period of about 5 minutes, transfer to the second acid bath of the same strength. The prints should pass through at least 3 and preferably 4 acid baths, to remove all traces of iron that may remain in the pores of the paper.

When thoroughly cleared, the print should be washed from 10 to 20 minutes in running water. If running water is not available, several changes of water in the tray will be necessary.

"Water Tone" Platinum Paper.—"Water tone" platinum paper is very easily affected by moisture; it will, therefore, be noticed when printing in warm, damp weather that the print will show quite a tendency to print out black in the deep shadows. This must not be taken into consideration, as the same amount of exposure is necessary as in dry days.

Print by direct light (sunlight preferred) until the shadows are clearly outlined in a deep canary color. At this stage the same detail will be observed in the half tones that the finished print will show. For developing, use plain water, heated to 120° F. (which will be as hot as they can bear).

The development will be practically instantaneous, and care must be taken to avoid air bubbles forming upon the surface of the prints. Place prints, after developing, directly into a clearing bath of muriatic acid, 1 drachm to 12 ounces of water, and let them remain in this bath about 10 minutes, when they are ready for the final washing of 15 minutes in running water, or 5 changes of about 3 minutes each. Lay out between blotters to dry, and mount by attaching the corners.

Bradley Platinum Paper.—Developer.

A.—For black tones:

Neutral oxalate potassium	8 ounces
Potassium phosphate	1 ounce
Water	30 ounces

B.—For sepia tones:

Of above mixed solution	8 ounces
Saturated bichloride mercury solution	1 ounce
Citrate soda	5 grains

If deep red tones are desired add to B

Nitrate uranium..... 10 grains

Then filter and use as a developer.

W. & C. Platinotype.—Development.—The whole contents of the box of the W. & C. developing salts must be dissolved at one time, as the salts are mixed; and if this be not done, too large a proportion of one of the ingredients may be used.

Development should be conducted in a feeble white light, similar to that used when cutting up the paper, or by gas light.

It may take place immediately after the print is exposed, or at the end of the day's printing.

Develop by floating the print, exposed side downwards, on the developing solution.

Development may take 30 seconds or more.

During the hot summer days it is not advisable to unduly delay the development of exposed prints. If possible develop within 1 hour after printing.

Either porcelain or agate—preferably porcelain—dishes are necessary to hold the developing solution.

To clear the developed prints: These must be washed in a series of baths (not less than three) of a weak solution of muriatic acid C. P. This solution is made by mixing 1 part of acid in 60 parts of water.

As soon as the print has been removed from the developing dish it must be immersed face downwards in the first bath of this acid, contained in a porcelain dish, in which it should remain about 5 minutes; meanwhile other prints follow until all are developed. The prints must then be removed to a second acid bath for about 10 minutes; afterwards to the third bath for about 15 minutes. While the prints remain in these acid baths they should be moved so that the solution has free access to their surfaces, but care should be taken not to abrade them by undue friction.

Pure muriatic acid must be used.

If commercial muriatic acid be used, the prints will be discolored and turn yellow.

For each batch of prints fresh acid baths must be used.

After the prints have passed through the acid baths they should be well washed in three changes of water during about a half hour. It is advisable to add a pinch of washing soda to the second washing water to neutralize any acid remaining in the print. Do not use water that contains iron, as it tends to turn paper yellow. Soft water is the best for this purpose.

W. & C. Sepia Paper.—With a few exceptions the method of carrying out the operations is the same as for the "black" kinds of platinotype paper. The following points should be attended to:

The "sepia" paper is more easily affected by faint light, and, therefore, increased care must be taken when printing.

To develop, add to each ounce of the developing solution 1½ drachms of sepia solution supplied for this purpose, and proceed as described for black paper.

The solution must be heated to a temperature of 150° to 160° F., to obtain the greatest amount of brilliance and the warmest color, but very good results can be obtained by using a cooler developer.

Variations of the Sepia Developer.—Primarily the object of the sepia solution in the developer is to increase the brightness of the prints, as, for example, when the negative is thin and flat, or pense and flat, the addition of the sepia solution to the developer clears up, to some extent, the flatness of the print by taking out traces of the finer detail in the higher lights, which is often a decided improvement. If, however, the negative be dense, with clear shadows, the sepia solution may be discarded altogether. This will prevent the loss of any of the finer detail and greatly reduce harshness in the prints. Sometimes a half, or even a quarter, of the quantity of the sepia solution recommended as an addition to the developer will be sufficient, depending altogether upon the strength of the negatives. Prints developed without the solution have less of the sepia quality but are very agreeable nevertheless. It should be remembered that the sepia paper is totally different from the black, and will develop sepia tones on a developer to which no sepia solution has been added. The sepia solution clears up and brightens the flat, muddy (to some extent, not totally) effects from the thinner class of negatives.

The Glycerine Process.—The "glycerine process," or the process of developing platinotype prints by application of the developing agent with the brush, is perhaps one of the most interesting and fascinating of photographic processes, owing to its far-reaching possibilities.